

# ***Headquarters U.S. Air Force***

---

***Integrity - Service - Excellence***

## **Air Force Energy Strategy**



**Dr. Ron Sega**  
**Under Secretary of the Air Force**

**April 19, 2006**

---



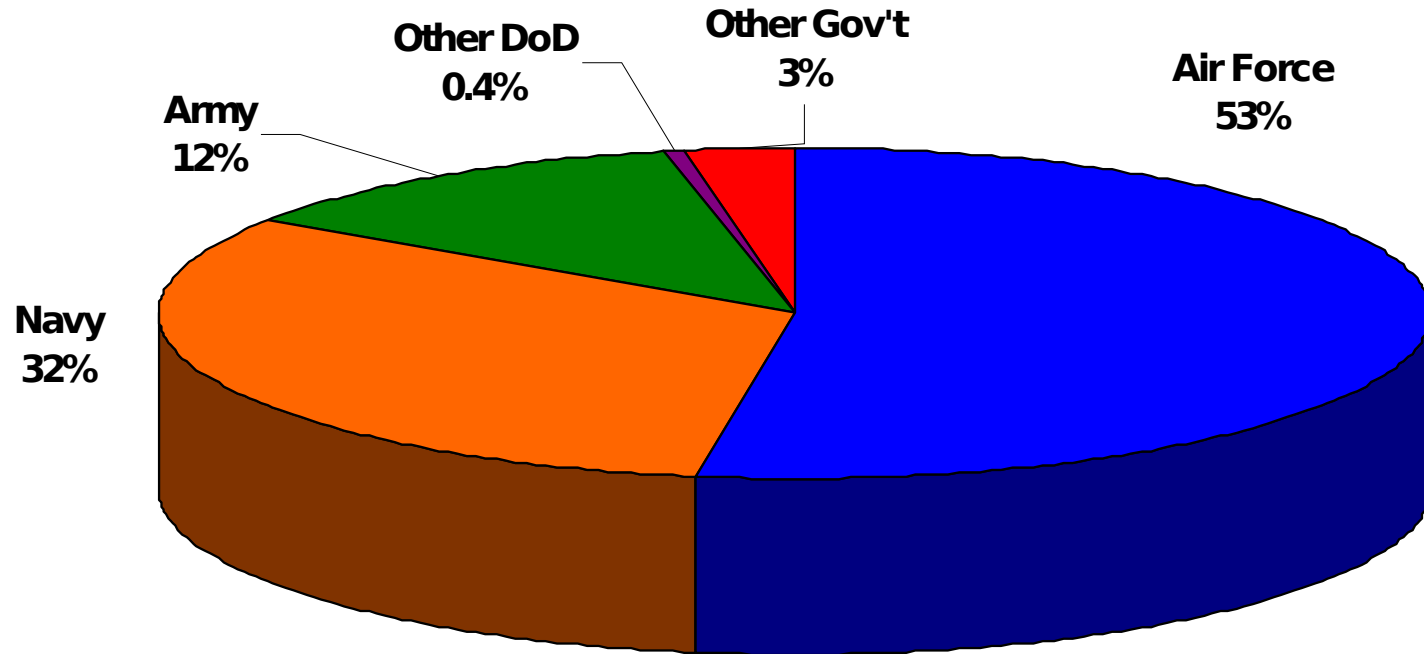
# ***Background Facts and Figures***

---

- **OSD facility energy policy guidance published**
  - **Increased energy conservation goal - 2% per year (2003 base)**
  - **Established renewable energy goals - 7.5% by 2013**
    - **USAF at 11% in 2005**
- **USAF leadership recognized**
  - **EPA 2005 Green Power Partnership Award**
    - **Nation's top purchaser of Green Power**
    - **1 Million Megawatt hours in FY05**
  - **EPA 2006 Climate Protection Award**
- **USAF Energy needs approaching \$5B / Year**
  - **3.2B gallons per year (FY03) - 45M pounds/day**
  - **Costs have doubled since 9/11**



# ***US Government Fuel Consumption***

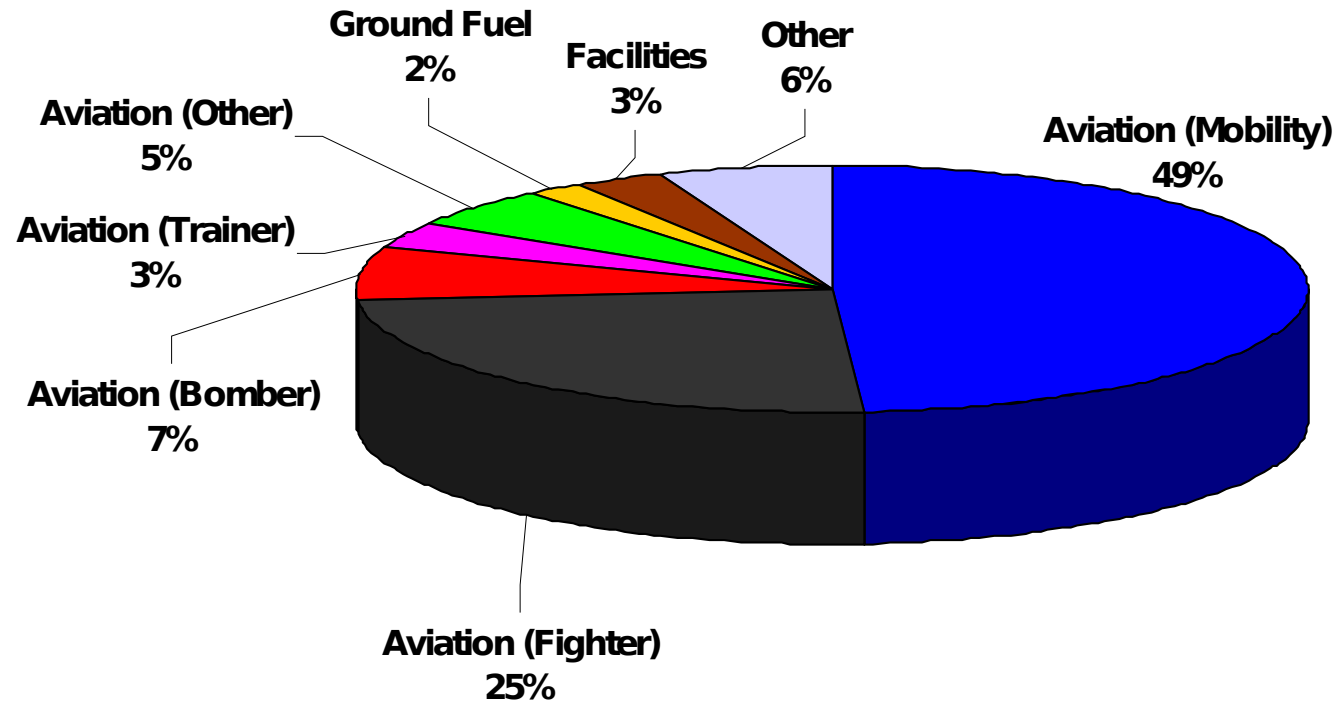
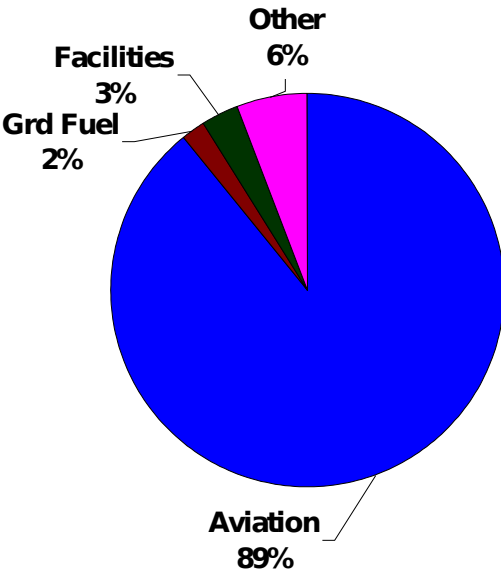


**DoD Uses 97% of all US Government Fuel Consumed**

**Source: DESC FY05 Fact Book**



# Air Force Energy Use (cost)



Source:  
DESC FY 05 Fact Book  
MAJCOM energy usage  
reporting

**AF Energy Bill (Fuel) exceeds \$10M per day**

**Every \$10/barrel increase drives up AF fuel costs \$600M per year**



# ***Establishing the Vision (draft)***

---

- **Provide leadership in developing energy options to increase warfighting capability**
  - **Enable secure and reliable energy alternatives**
  - **Increase energy use efficiency**
  - **Reduce life cycle costs**





# ***AF Energy Strategy***

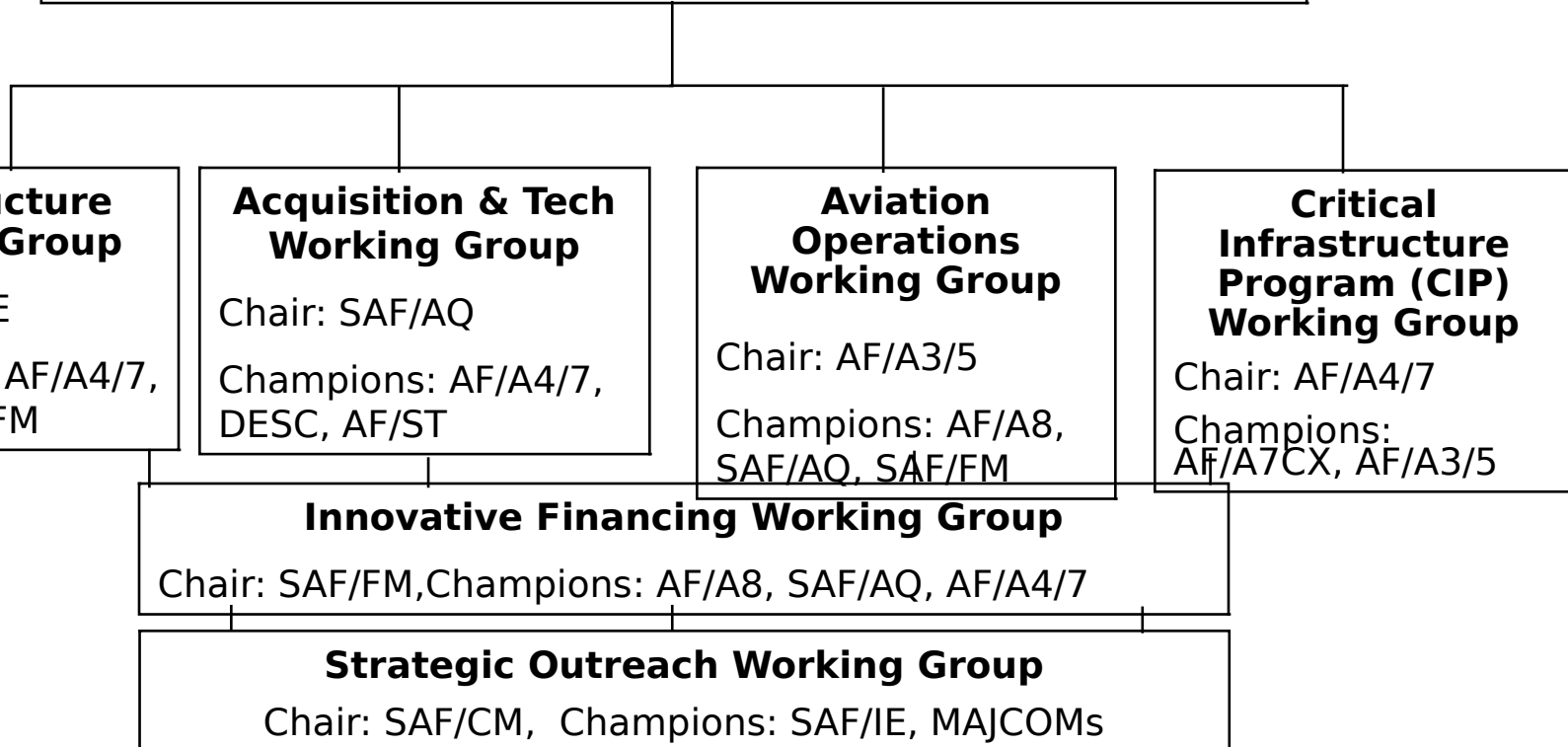
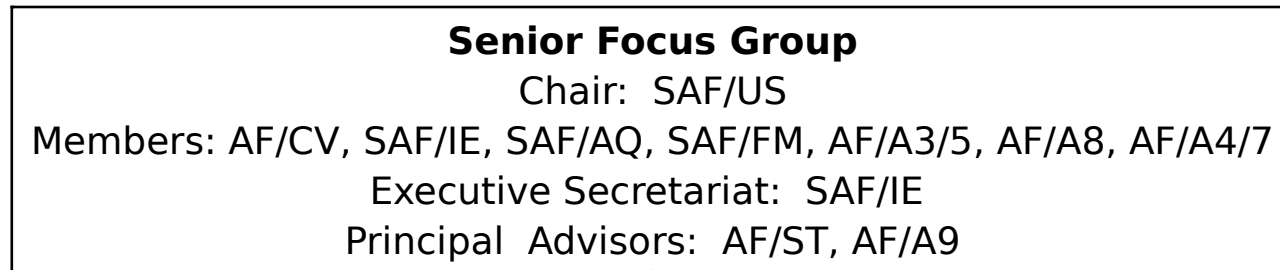
## ***Addressing Supply & Demand***

- **Make energy a consideration in all Air Force actions**
- **Promote a culture where Airmen conserve energy (supply)**
- **Accelerate development and use of alternative fuels (demand)**
- **Mitigate energy-related critical infrastructure vulnerabilities**





# ***Air Force Energy Strategy Oversight Structure***







# *Infrastructure*

## ■ Ground Transportation

- Continue to expand flex-fueled vehicle fleet and necessary infrastructure
- **Establish a Low Speed Vehicle procurement initiative**
- Expand Fuel Cell/Hydrogen fueled vehicle capability at WR-ALC

## ■ Facilities

- Continue procuring cost effective “green power”
- Sponsor USAFA Institute of Energy installation energy audits
- **Maximize energy savings in new construction (post-BRAC)**
- Expand Utility Rate Assessments - Ensure fair pricing on energy purchases







# ***Acquisition & Technology Near & Mid Term***

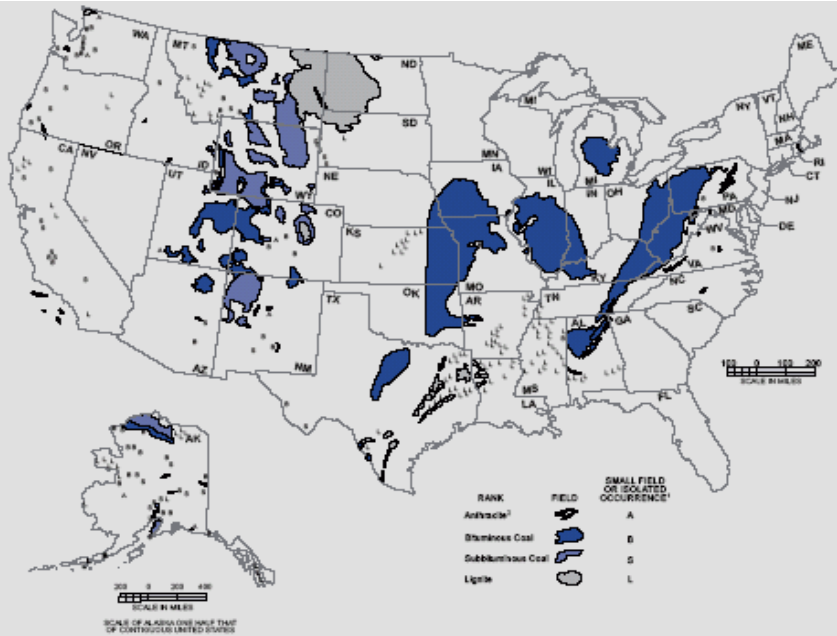
- **Alternative Fuels Initiative (Coal, Nat'l Gas, Oil Shale, BioMass)**
  - **Flight Demonstration (Summer / Fall 06)**
  - **Joint DOD/DOE Assured Fuels Study & Report to Congress (Jun 06)**
- **Aircraft Technology Improvement Initiative**
  - **Engine Technology - Versatile Affordable Advanced Turbine Engine (VAATE) program: reduce specific fuel consumption 25%**
  - **Aircraft Structures: survivable integrated inlet, advanced aluminum aero structures, ultra-lightweight multifunctional airframe**
- **Modernization Initiatives and Studies**
  - **SAB Study on Improved Air Vehicle Efficiency (Complete- Feb 06)**
  - **NRC Propulsion Study (Underway, Jul 06)**
  - **AFMC Re-engine Study (Underway, Dec 06)**





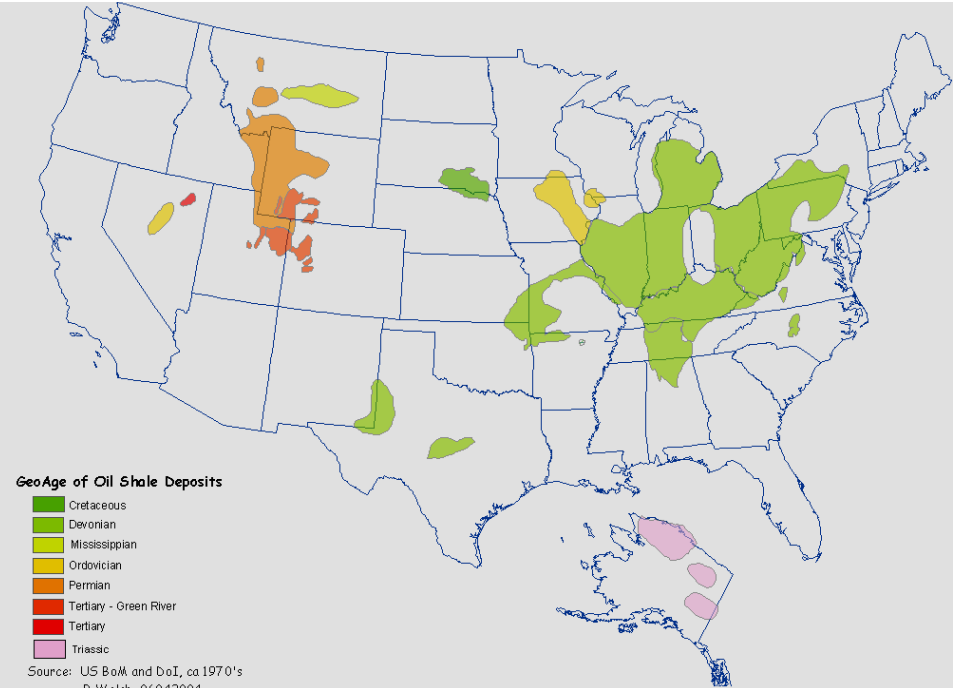
# Evaluating All US Energy Resources

## Coal



Sources: United States Geological Survey, Coalfields of the United States, 1960-1961; Texas Bureau of Economic Geology, Lignite Resources in Texas, 1980; Louisiana Geological Survey, Near Surface Lignite in Louisiana, 1981; Colorado Geological Survey, Coal Resources and Development Map, 1981; and Mississippi Bureau of Geology, 1983.

## Oil Shale



## Annual Domestic Consumption

**Oil:** 7.5 billion  
**Natural Gas:** 3.8 billion  
**Coal:** .005 billion

**Total:** 11.1 billion barrels  
equivalent

## Domestic Reserves

**Oil:** 23 billion barrels  
**Shale:** 1400 billion barrels  
**Coal:** 800 billion barrels

**Total:** 2.2+ trillion barrels  
equivalent



# ***Jet SynFuel Initiative***

---

- **Procure 100,000 gallons natural gas SynFuel in FY06**
  - **Quantify fuel**
  - **Conduct flight demo later this summer (B-52)**
  - **Finalize economic modeling of cost/benefits with DOE**
- **Explore increased purchase of SynFuel**
  - **Certify fuel for military aviation use**
  - **Gain added logistics and handling experience**



# ***Jet SynFuel Initiative***

---



---

***Integrity - Service - Excellence***



# ***Acquisition & Technology Near & Mid Term***

- **Alternative Fuels Initiative (Coal, Nat'l Gas, Oil Shale, BioMass)**
  - **Flight Demonstration (Summer / Fall 06)**
  - **Joint DOD/DOE Assured Fuels Study & Report to Congress (Jun 06)**
- **Aircraft Technology Improvement Initiative**
  - **Engine Technology** - Versatile Affordable Advanced Turbine Engine (VAATE) program: reduce specific fuel consumption 25%
  - **Aircraft Structures**: survivable integrated inlet, advanced aluminum aero structures, ultra-lightweight multifunctional airframe
- **Modernization Initiatives and Studies**
  - **SAB Study on Improved Air Vehicle Efficiency (Complete-Feb 06)**
  - **NRC Propulsion Study (Underway, Jul 06)**
  - **AFMC Re-engine Study (Underway, Dec 06)**





# ***Aviation Operations Near & Mid Term***

---

- **Air Force is investing in simulators -- FYDP \$2B**
  - **Moving 10% of current CAF and MAF live fly training into simulators**
- **Distributed Mission Ops (DMO) is expanding (\$1.5B across FYDP)**
- **Benchmarking commercial aviations practices**
- **Investigating crew and cargo scheduling efficiencies**
- **Assessing equipping of fighters and bombers for Reduced Vertical Separation Minimum (RVSM) capability**



# ***Audit & Metrics***

- **Conducting audits of USAF aviation fuel optimization initiatives**
  - **Aircrew Training - assess simulator usage to satisfy pilot training**
  - **Aircraft Scheduling & Operations - assess optimization measures**
  - **Aviation Fuel Consumption - assess fuel consumption data process**
    - **Evaluate FES ( Fuels Automated System-- Enterprise System) consumption data reliability**
    - **Assess data collection methods used**
  - **Defense Energy Studies**
    - **Assess USAF implementation of Defense study recommendations**
- **Identify additional follow on audits as needed**





# ***Energy and Space Assets***

---

- **Saturn V**
  - 1.4M pounds of RP-1 (High grade kerosene)
  - 3.2M pounds of liquid oxygen (LOX)

- **Atlas V**
  - 190K pounds of RP-1
  - 435K pounds of LOX

- **Costs:**

	<u>1970</u>	<u>2006</u>
RP-1	\$.05/pound	\$ .28/pound
Liquid Hydrogen	\$.45/pound	\$3.15/pound



# Summary

- **Energy is a National Security Issue**
- **The DoD is taking positive steps**
- **Additional energy initiatives are in development**
  - **Joint AF/DOE Study on Alternative Fuels started**
  - **Defense Science Board -- Task Force on Energy**

